

MacDonald (G. F.)

STATE OF NEW YORK.

REPORT

OF

CARLOS F. MACDONALD, M. D.,

ON THE

EXECUTION BY ELECTRICITY

OF

WILLIAM KEMMLER, ALIAS JOHN HART.



Presented to the Governor September 20, 1890.

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THE ARGUS COMPANY, PRINTERS.

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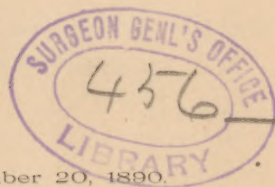
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REPORT.

To His Excellency, DAVID B. HILL,

Governor of the State of New York:

SIR.—In compliance with your request, previously made to me, to furnish you a detailed report of the facts and circumstances attending the execution of convict William Kemmler, *alias* John Hart, I have the honor to respectfully submit the following :

William Kemmler, *alias* John Hart, was duly executed by electricity at Auburn Prison, in the city of Auburn, Cayuga county, N. Y., at 6.49 o'clock A. M. on the 6th day of August, 1890. Present—The Agent and Warden of the prison and twenty-five official witnesses, as shown by the certificate of execution filed at the clerk's office of the county of Cayuga, and which reads as follows :

COURT OF OYER AND TERMINER, IN AND FOR ERIE COUNTY.

THE PEOPLE OF THE STATE OF NEW YORK *against* WILLIAM
KEMMLER, OTHERWISE CALLED JOHN HART.

STATE OF NEW YORK, } ss. :
COUNTY OF CAYUGA,

I, Charles F. Durston, Agent and Warden of Auburn State Prison, at Auburn, Cayuga county, do hereby certify, pursuant to section 508 of the Code of Criminal Procedure of the State of New York, that, in obedience to, and in conformity with, the judgment and sentence of the above-named court, and the warrants of said court, a copy of which is hereto annexed, I, said Agent and Warden at the said State Prison, at the city of Auburn, on the 6th day of August, 1890, did attend upon the execution of the judgment and sentence, and that the said William Kemmler, otherwise called John Hart, the convict therein mentioned, was then and there, to wit,

at the place and time last aforesaid, executed in conformity to the said judgment and sentence of said court, and in accordance with the provisions of the Code of Criminal Procedure of the State of New York. I do further certify that the persons whose names are hereinafter signed were the persons invited by me, as such Agent and Warden, to be present at said execution, and that said persons were all the persons present and witnessing the execution of said judgment and sentence upon the said William Kemmler, otherwise called John Hart.

Dated at Auburn, Cayuga county, State of New York, this 6th day of August, 1890.

(Signed.) CHARLES F. DURSTON,
Agent and Warden.

The undersigned, being the persons and all the persons present and witnessing the execution of the judgment and sentence set forth in the foregoing certificate, do hereby, pursuant to the statute, and at the city of Auburn, county of Cayuga and State of New York aforesaid, on the 6th day of August, 1890, subscribe the foregoing certificate:

LOUIS BALCH. (M. D.)	E. C. SPITZKA. (M. D.)
W. T. NELLIS. (M. D.)	CARLOS F. MACDONALD. (M. D.)
J. M. JENKINS. (M. D.)	GEORGE E. FELL. (M. D.)
W. T. JENKINS. (M. D.)	OLIVER A. JENKINS.
JOSEPH FOWLER. (M. D.)	JOSEPH C. VELING.
HENRY A. ARGUE. (M. D.)	HORATIO YATES.
C. W. DANIELS. (M. D.)	TRACY C. BECKER.
A. P. SOUTHWICK. (M. D.)	MICHAEL CONWAY.
C. A. HOUGHTON.	GEORGE GRANTHAM BAIN.
C. R. HUNTLY.	FRANK W. MACK.
H. E. ALLISON. (M. D.)	GEORGE F. SHRADY. (M. D.)
T. K. SMITH. (M. D.)	GEORGE W. IRISH.
ROBERT DUNLAP.	

Of the witnesses present fourteen were physicians, two of whom, Carlos F. MacDonald and E. C. Spitzka, were officially designated as physicians by the Warden, in pursuance of the statute.

The execution took place in a room set apart for the purpose, in the basement of the administration building of the prison, to which

the electric current was conducted by means of an ordinary electric light wire. The apparatus consisted of a stationary engine, an alternating current dynamo and exciter, a Cardew volt-meter, with extra resistance coil, calibrated for a range of from 30 to 2,000 volts; an ammeter for alternating currents from 0.10 to 3.00 amperes, a Wheatstone bridge, rheostat, bell signals and necessary switches; a death chair, with adjustable head-rest, binding straps and two adjustable electrodes. The dynamo was an alternating current dynamo intended to supply 750 incandescent lamps of sixteen-candle power each, and capable of generating, as shown by careful tests made several months prior to the execution, a maximum electromotive force or current of 2,376 volts, the commercial and mean voltage being 1,680 and 1,512, respectively, the speed of the dynamo being 1,900 revolutions and of the exciter 2,700. The chair, a square-framed heavy oaken one, with a high, slightly sloping back and broad arms, was fastened to the floor, the feet of the chair being properly insulated. Attached to the back of the chair, above the head rest, was a sliding arrangement shaped like a figure four (4), the base or horizontal arm of which projected forward, and from which was suspended the head electrode, so as to rest on the vertex, or top of the head, against which it was firmly held by means of a spiral spring. The spinal or body electrode was attached to the lower part of the back of the chair and projected forward horizontally on a level with the lower portion of that part of the spine known as the hollow of the sacrum. The electrodes each consisted of a bell-shaped rubber cup, about four inches in diameter, the part corresponding to the handle of the bell being of wood, through the long axis of which the wire passed into the bell, terminating in a metallic disc about three inches in diameter and faced with a layer of sponge. The lower electrode was also provided with a sliding arrangement and spiral spring to hold it in place, while a broad strap fastened to the back of the chair and passed around the lower part of the prisoner's abdo-

men rendered the contact secure. The prisoner's head was firmly secured by means of conjoined leather bands, which encircled the forehead and chin, and were fastened to the back of the almost perpendicular head rest, while the chest, arms and legs were secured by broad straps attached to corresponding portions of the chair. The wire attached to the head electrode descended from the ceiling, and that of the lower one passed along the floor, being protected by a strip of wood.

The dynamo and engine were located in one of the prison shops, several hundred feet distant from the execution-room; the voltmeter, switch and other instruments for determining the pressure were located in a room adjoining the execution-room, which contained the death chair, electrodes and connecting wires. Communication between the meter-room and dynamo-room was by means of electric signals.

Kemmler was brought into the execution-room by the Warden and introduced to the witnesses, who were seated in a semi-circle, facing the death chair. On entering the room he appeared strikingly calm and collected. In fact, his manner and appearance indicated a state of subdued elation, as if gratified at being the central figure of the occasion, his low order of intelligence evidently rendering him unable to fully appreciate the gravity of his situation. He was given a chair near the death chair, and, on being seated, in response to the Warden's introduction, said: "Well, I wish everyone good luck in this world, and I think I am going to a good place, and the papers has been saying a lot of stuff about me that wasn't true. That's all I have to say." At the Warden's bidding he then arose, removed his coat, and without the least display of emotion or nervousness, took his seat in the death chair, calmly submitting to the adjustment of the electrodes and binding straps, himself aiding the proceedings by suggestions and fixing his body and limbs in proper position. Observing the nervousness of the assistants who were adjusting the straps, he admonished them not to

hurry, and said he wanted them to "be sure that everything is all right." He pressed his bared back firmly against the spinal electrode and requested that the head electrode be pressed down harder on the top of his head, from which the hair had been imperfectly clipped before he entered the room, remarking, at the same time, that he desired to perform his part to the best of his ability. The preparations terminated with a final moistening of the electrodes, the whole occupying, at most, between three and four minutes. Everything being seemingly ready, the Warden signaled to his assistants in charge of the switches in the adjoining room to turn the lever, which closed the circuit and instantly sent the deadly current through the prisoner's body. The instant the contact was made the body was thrown into a state of marked rigidity, every fiber of the entire muscular system being apparently in that fixed, rigid condition known to physicians as tonic spasm. Synchronously with the onset of rigidity bodily sensation, motion and consciousness were absolutely suspended, and remained so while electrical contact was maintained. At the end of seventeen seconds Kemmler was pronounced dead, none of the witnesses dissenting, and the Warden signaled to have the contact broken, which was done.

Before Kemmler was brought into the room the Warden asked the physicians how long the contact should be maintained; I replied twenty seconds, but subsequently assented to ten seconds, in deference to the opinion of my associate physician that a considerably less period of time would suffice, an opinion which, doubtless, would have been sustained had the voltage been 2,000 or more.

For obvious reasons the only means of determining the question of death was by ocular demonstration; so that it cannot be positively asserted that the heart's action entirely ceased with the onset of unconsciousness, though in all probability it did. 5

When the electrical contact was broken the condition of rigidity, noted above, was instantly succeeded by one of complete muscular relaxation. At the same time superficial discolorations, resembling

commencing capillary post-mortem changes, were observed on the surface of exposed portions of the body, especially the face. The body remained motionless, and apparently lifeless, for approximately one-half minute, when there occurred a series of slight spasmodic movements of the chest, accompanied by the expulsion of a small amount of mucus from the mouth. There were no evidences of a return of consciousness or of bodily sensation; but in view of the possibility that life was not wholly extinct beyond resuscitation, and in order to take no risk of such a contingency, the current was ordered to be reapplied, which was done within about two minutes from the time the first contact was broken. The sudden muscular rigidity noted on the first closure of the circuit was again observed and continued until the contact was again broken, when the opposite state of complete muscular relaxation reappeared. The second closure of the circuit was inadvertently maintained for about seventy seconds, when a small volume of smoke was seen to issue from the point of application of the spinal electrode, due, as was subsequently found, to momentary scorching of the edge of the sponge with which the electrode was faced, and from which the moisture had been evaporated by prolonged contact of the current. The odor of the burning sponge was faintly perceptible in the room. There was also some burning, or rather desiccation, of the already dead body, immediately underneath the electrodes, especially under the lower one, which will be fully described in connection with the autopsy.

A careful examination of the body was now made, in which most of the medical witnesses participated to a greater or less extent. The wrists were found to be pulseless, the heart had ceased to beat, the pupils were dilated, and the corneæ, or anterior surface of the eye-balls, were depressed and flaccid on pressure. In other words, William Kemmler was dead, and the intent and purpose of the law, to effect sudden and painless death in the execution of criminals, had been completely and successfully carried out.

AUTOPSY.

The autopsy was held about three hours after death. All of the witnesses to the execution who desired to do so being present. The examination was, by verbal direction of the Warden, under my personal supervision, and was performed by Doctors E. C. Spitzka, George F. Shrady and W. T. Jenkins, of New York, and Doctors C. M. Daniels and George E. Fell, of Buffalo, N. Y. To Dr. Jenkins was assigned the removal of the chest and abdominal organs; to Dr. Daniels, the removal of the brain and spinal cord, and to Dr. Spitzka, the examination of the brain and cord. Dr. Fell examined specimens of the blood, microscopically, and Dr. Shrady kindly took stenographic notes, and subsequently compiled therefrom the report of the examination, substantially as follows:

Body fairly well nourished. Rigor mortis marked, particularly in the muscles of the jaw, neck and thorax, and gradually extending from above downward, involving the feet and legs last. Post-mortem discoloration existed over lower portion (posterior and lateral aspects of trunk) of body and extended up as far as the anterior axillary line, also on the pendant surfaces of the upper and lower extremities. The upper extremities were partly flexed and rotated outward, the nails showing post-mortem lividity. There was a seminal discharge, which, on microscopic examination, was found to contain a large quantity of dead spermatozoa. There was marked post-mortem discoloration of the forehead, about an inch in width, corresponding with the position of the strap, beginning at the hair on the left side and extending to the hair line on the right side. A corresponding discoloration from the pressure of the chin strap was also noted. There was an oval depression of the scalp upon the vertex, due to pressure of electrode, beginning at the anterior hair line and measuring four inches in its long and three and one-half inches in its

short diameter. Anterior to the posterior portion of the depression and in the immediate line there was a vesication one and one-half inches in length and half an inch in width, very superficial in character, crescentic in shape, and upon which the hair appeared to be slightly scorched. On the small of the back, corresponding to the level of the fourth sacral vertebra below, and second above, four and one-half inches in vertical diameter and four and one-half inches in transverse diameter, was a burn, presenting four concentric zones, of which the outermost had a pale area, corresponding to that of the rubber cup of the electrode and one-fourth of an inch in diameter.

Succeeding this was a vesication, partial below and complete above, about an inch in diameter above and one-third of an inch below.

Then followed another zone, which was in its upper third a complete eschar, black in appearance, and in its lower part showed desiccation of a greenish-brown color. The last or inner zone showed a number of vesicles, chiefly peripheral, and below the center was a black eschar, half an inch in its vertical and five-eighths of an inch in its transverse diameter. Above was a tongue-shaped pale area with a lateral projection to the left of the median line, extending about two inches, and an upper projection in the dorsal furrow, which was more sharply pointed, and which on its periphery showed a reddened portion, with here and there vesication. In addition, the back showed a number of depressions produced by the folds of the shirt and suspenders, such as are commonly found in dead bodies lying on the back.

On incising the skin over the sternum (breast-bone) the blood which escaped was unusually dark and fluid, and remained so on exposure. The muscles of the thorax were of the usual color. "Tardieu spots" were noticed on the posterior border of the lower lobe of the left lung. When placed in water more than half of the lung floated above the surface, showing a marked

emphysematous condition. The bronchi were normal in appearance and contained mucus and air bubbles. The right lung was adherent throughout to the diaphragm. In the middle lobe of this lung there were numerous well marked "Tardieu spots." The heart weighed five and three-fourths ounces; its valves and substance were normal in appearance, and its ventricles were empty. The stomach contained a pint of undigested food. The blood from the cut surface of the liver was of a dark crimson hue. The gall bladder was distended with bile. The spleen was normal in size and appearance. The left kidney weighed three and one-half ounces and the right three ounces; both were markedly congested. There was no vermicular action of the intestines on exposure to the air or on irritation. The bladder was contracted.

The scalp on being removed showed the outer aspect of the vertex of the skull to be in a desiccated condition, corresponding with the contact of the electrode as previously noted, but of a larger area, being four inches by four inches, the zone of the scalp being only two and one-half by three inches, the long diameter being antero-posterior. On removal of the skull cap the dura was normal in texture, somewhat dull in color, particularly over the area corresponding with the zone of contact. In the pre-rolandic region the meningeal vessels, measuring along the convexity antero-posteriorly four inches on the left side and three on the right, were filled with carbonized blood. On the internal aspect of the calvarium the meningeal vessels in the dura and in their contents appeared to be black and carbonized. The carbonized vessels were so brittle that their ends were torn off with the calvarium and presented a broken, crummy appearance. This carbonization was limited in an abrupt manner. The other meningeal vessels, in the region corresponding to the outer burn previously described, contained blood of a dark crimson hue. In the narrowest portion of this region was seen, a little posteriorly, in the median line, a dark discoloration sending out a right lateral prolongation three-fourths of an inch in the direction of the

longitudinal sinus, and in width seven-eighths of an inch. Over the left cerebral hemisphere, one-third of an inch to the left of the median line, there was a deep carbonized spot corresponding with the desiccated portion of the calvarium. The pia and gyri themselves were of a pale buff color, the rest of the cerebral cortex was normal in appearance. While observing this anæmic area, it was noticed that its blood vessels began to fill. The pia and arachnoid on the convexity of the brain were perfectly normal. An interesting fact was observed on handling the pons varolii and medulla oblongata, in that they were found to be warm. By a thermometer inserted in the fourth ventricle, the temperature was noted at ninety-seven degrees Fahrenheit. The area of this temperature corresponded with an area of temperature on the back of the neck, which was noted at ninety-nine degrees Fahrenheit, three hours post-mortem, the temperature of the room being eighty-three degrees Fahrenheit. The smaller vessels of the pia were ectatic. *Capillary hemorrhages were noted in the floor of the fourth ventricle, also in the third ventricle and the anterior portion of the lateral ventricle. The perivascular spaces appeared to be distended with serum and blood.* The brain cortex in the area of contact was sensibly hardened to one sixth of its depth, where there was a broken line of vascularity. The vessels over the corpus striatum showed enlargements in different parts of their ramifications. The pons was slightly softened. The burned integument of the back, on being removed showed the spinal muscles underneath to be cooked, liked "over-done beef," throughout their entire thickness. The spinal cord was removed entire, but showed no gross appearances of pathological condition. Portions of the brain and spinal cord were preserved by members of the staff for purposes of hardening and microscopical examination. The blood taken immediately after death showed, under microscope, a markedly granular condition, almost suggesting an electrolytic dissolution of the red corpuscles.

A preliminary microscopical examination of portions of the brain and spinal cord, including specimens from all the cerebral lobes of both sides, segments of the cervical, dorsal and lumbar regions of the spinal cord, with the connected nerve groups, was subsequently made by Dr. Spitzka, who states as follows :

"The brain, spinal cord and peripheral nerves appeared structurally healthy in every portion examined, except in the area corresponding to the discolored (anæmic through extreme contraction of vascular channels) area of the Rolandic and pre-Rolandic regions, the ventricular surfaces, and the pons and medulla oblongata. The latter, which had been the seat of a remarkable post mortem preservation of a temperature approaching that of the normal human body, were distinctly softer than the observer has been accustomed to find these parts in autopsies on persons of Kemmler's age, and performed so soon after death. The hæmorrhagic spots in the fourth ventricle, which were strongly marked, were not accompanied by signs of parenchymatous rupture of larger vessels. Hence they may be regarded as having the same significance as the '*taches de Tardieu*' found on the surfaces of other organs, notably, the heart and lungs.

"The peculiar softened vesicular zone of tissue underlying the outermost layer of the cerebral cortex, being very fragile, will require extreme care in hardening and manipulation to enable me to obtain reliable specimens. It is noteworthy that this 'destruction line' runs parallel to the free surface of the brain and does not 'dip' with the sulci.

"Examination of the fresh specimen revealed the existence of vacuoles (probably gas-bubbles) in the ganglion cells and in the parenchyma of the 'destruction line.' From the fact that no hæmorrhages had occurred in this softened area, it is a just inference that it was produced after life had become entirely extinct, for the continuance of a blood circulation in a softened-brain area is incompatible with the bloodless appearance, already noted, and the absence of capillary hæmorrhages in this very district, while they were present in those remote from the site of the electrode.

"A more minute analysis will be completed, but cannot be reported until some future time."

REMARKS.

Notwithstanding the wide publication of unofficial reports of the execution of Kemmler, and the efforts which have been made to proclaim it a failure, and to invest it with an air of repulsion, brutality and horror, it is confidently believed that when all the facts in the case are rightly understood, the first execution by electricity will be regarded as a successful experiment, and that in time due credit will be accorded to those whose duty required them to act as principals in carrying out the law, the establishment of which is destined, in the not distant future, to be regarded as a step in the direction of a higher civilization.

As might naturally have been expected, at the first execution by this method, there were certain defects of a minor character, in the arrangement and operation of the apparatus, which those in charge of the next execution, guided by present experience, will be able to avoid or overcome. But, in spite of these defects, the important fact remains that unconsciousness was instantly effected, and death was painless. When this is understood, together with the additional fact that less than four minutes elapsed from the time the first contact of the current was made to the time the last one was discontinued, and Kemmler was absolutely dead, it will be conceded by all fair-minded persons that the object to be attained, so far as relates to the individual, in the execution of a criminal, namely, sudden and painless death, was fully realized in Kemmler's case; and had the first contact of the current been maintained for full twenty seconds, as first suggested, in all probability there would have been no reflex muscular movement after it was broken, and no unfavorable criticism of the result could then have truthfully been made. The reflex movements referred to were similar to those which have occasionally been observed, for a short time, in animals experimentally killed by electricity, after the current was too quickly interrupted, the animal, however, not recovering conscious-

ness nor life: hence they may properly be regarded as involuntary muscular movements of a reflex character, following the interruption of the current, and in no sense a resumption of normal respiration, however much they may appear to be so to a superficial observer, or to one not familiar with the phenomena in animals above referred to. These movements are as nothing compared with those usually exhibited by animals suddenly decapitated, and which usually continue for some seconds or even minutes.

In the excitement and confusion of the moment, occasioned by the suspicion, on the part of some, that death was not complete, the second application of the current was maintained too long, nearly one and one-half minutes. If there was a spark of unconscious vitality remaining in Kemmuler's body after the first contact was broken — there certainly was no conscious life — it was absolutely extinguished the instant the second and last contact was made. That the man was dead, however, long before the burning of the sponge and desiccation occurred, there is no reason to doubt.

Unfortunately, the volt-meter and other appliances for determining the strength of the current were not located in the execution-room, hence none of the official witnesses could know precisely what the voltage was at the moment the current was applied. But reasoning from the known lethal effect of an electro-motive pressure of 1,000 volts, as shown by deaths which have occurred from accidental contact with electric wires, as well as by numerous experiments on animals, whose weight and resistance exceeded those of man, affords solid ground for the conclusion that no human being could survive the passage through his body of an alternating electrical current of 1,000 volts for a period of twenty seconds, the contact being perfect.

It has been suggested that an error was committed in applying the electrodes to the head and spine instead of the hands. In answer to this may be stated a fact which is well known to physiologists and medical electricians, namely, that the sudden arrest of

a/ the heart's action can be more surely effected by destroying or paralyzing the brain center which controls such action, than by attacking the heart itself; hence, by including the brain directly in the circuit, the action of the heart is instantly arrested, while, at the same time, all the vital centers, including those of consciousness, are paralyzed; also, that the brain is very susceptible to the influence of electricity, and is readily affected, sometimes to an alarming extent, by the passage into it, through the skull, of ordinary currents, such as are obtained from medical batteries; that the nerve tissues contain an excess of moisture, and hence are among the best of conductors, while the amount of moisture and so-called animal matter contained in *live* bone is sufficient to render that substance a fairly good conductor. Further, it is not difficult to penetrate the hairy scalp by electricity if the hair be properly moistened, the conductivity of all the tissues of the body being dependent on the amount of water they contain.

The head electrode, which was originally suggested, but which was not used (though in all probability such form of head electrode will be used in the future), was designed to include the forehead, down to the eye-brows, in the zone of contact. The point of contact of the body electrode is not of material importance, but may be applied to the hand, foot, calf of the leg or any other indifferent part of the body.

Death in Kemmler's case was probably caused by sudden destructive change in the molecular elements of the brain centers and blood, but which, though sufficiently intense to instantly abolish all conscious life, was, apparently, not intense enough to effect immediate abolition of muscular contractility. The fact that the heart was found, on post-mortem examination, to be quite empty of blood, clearly indicates that its contents had been expelled and its action suddenly arrested by the influence of the shock, acting through the higher nerve centers.

That a method of judicially inflicting the penalty of death in

punishment of the crime of murder will ever be devised, which, in its operation, shall be divested of that sense of awe and dread usually experienced when in the presence of the mystery of death, is not to be expected; and even were it possible, the wisdom of such a method might well be questioned so long as the welfare and protection of society require the infliction of such a penalty to deter men from committing murder.

There are abundant reasons for believing that death by means of electricity is so rapid that the application of the current could be repeated several times within the interval that is known to elapse between the receipt of an injury, or a peripheral sensory impression, and its conscious perception by the brain through the medium of the sensory nerves. In other words, the electrical current would travel from the point of contact to the brain many times faster than sensory impressions or nerve-currents, the rate of velocity of the latter being, roughly speaking, only about one hundred and fifty-five feet per second, a rate which is quite slow in comparison with the lightning-like velocity of electricity, which travels at the rate of millions of feet per second. Thus it will readily be seen that an electrical current of lethal energy coming in contact with the body so as to include the brain in the circuit would reach the latter and produce unconsciousness long, comparatively, before any resultant sense of pain at the point of contact, or elsewhere, could be conveyed to and appreciated by that organ through the process of nerve-conduction, which, as has been shown, requires a distinctly appreciable period of time, the rate of transmission of painful sensations being even slower than that of ordinary tactile impressions.

A striking illustration of the relative slowness of nerve conduction as compared with electricity, was shown in a series of experiments in instantaneous photography recently conducted by Professor Muybridge in the following manner:

"The lantern was used to make a series of instantaneous photographs, and in order to make the intervals between the exposures, as well as the times of exposures exceedingly short, the plates were exposed and stopped by means of an electric current. One very interesting series of pictures made was intended to illustrate the slowness of the brain in receiving impressions. Two women were employed; one stood in a bath-tub and the other sat on a raised chair and poured a bucket of water over the standing woman's head and shoulders. In order to make the shock more intense, Professor Muybridge had filled the bucket with ice-water, unknown to the victim, who would not have awaited the douche so patiently had she known what its temperature was going to be. One view showed the water tipped over and falling, yet not quite touching the girl's head. The next view showed the water splashing from her head and shoulders, and yet there were no signs of sensation. In the third picture she was just beginning to respond to the shock, and the subsequent pictures illustrated the further phases of the response. The point of special interest, however, is in connection with the second view. The electric current had in that case first exposed the plate, and then after a very short interval had shut it off again; that is to say, had acted twice with an interval of time between the two sufficiently long for the sensitive plate to take an impression of the view, and this after the ice-water had touched the woman's shoulders, and before she was conscious of it."

Compared with hanging, in which death is frequently produced by strangulation, with every indication of conscious suffering for an appreciable time on the part of the victim, execution by electricity is infinitely preferable, both as regards the suddenness with which death is effected and the expedition with which all the immediate preliminary details may be arranged. By the latter method the fatal stroke renders its victim unconscious in an infinitesimal fraction of a second, so small as to be beyond the power of the human mind to estimate, while, at the same time, it disintegrates the nerve tissues and blood to an extent which insures an absoluteness of death in a shorter space of time than is possible by any other known method. In other words, it is the surest, quickest, most efficient and least painful method that has yet been devised.

The execution of Kemmler, from the time he entered the room until the second contact was interrupted, occupied not more than eight minutes ; whereas executions by hanging usually require from fifteen to thirty minutes. In fact, it not unfrequently happens that the heart continues to beat for that length of time after the fall of the fatal drop. Then, too, far more time is consumed in placing the prisoner on the gallows, pinioning his limbs, putting on the black cap, placing the noose about his neck and carefully adjusting the knot under his left ear (from whence it sometimes slips at the critical moment, resulting in strangulation instead of a broken neck), than would be required for arranging the preliminary details of an electrical execution. During the preparation of this report the Associated Press dispatches contained an account of a hanging in which the criminal's head was almost completely torn from the body.

RECOMMENDATIONS.

1. The statute providing for the execution of criminals by electricity should be amended so as to provide for but one plant, to be located in the central part of the State, in a building especially constructed for the purpose. The building should contain the necessary electrical apparatus, an engine, execution-room, solitary cells and quarters for the guards and other necessary officials, the apparatus to be in charge of and operated by a competent, accredited electrician.

2. The engine and dynamo should be especially constructed for the purpose, and should be capable of generating an electro-motive force of at least three thousand volts, in order to insure the maximum voltage that would be necessary, and at the same time cause no injustice to any electrical lighting company, such as is likely to be the case so long as commercial dynamos are used in executing criminals.

3. The volt-meter should be located in the execution-room, and a competent and responsible official should be detailed to take the readings of the meter before and at the instant the current is applied. The voltage should not be less than 1,500 nor more than 2,000, and should be a matter of official record. The prisoner's resistance should also be taken immediately before bringing him into the execution-room.

4. The statute should require an official report of each execution to be made to the Governor within ten days after the execution takes place.

CARLOS F. MACDONALD,

[*President State Commission in Lunacy.*]

